

8.20 QUEEN ANNE'S COUNTY

This chapter presents information about stream conditions of potential management interest in Queen Anne's County based on the 2000-2004 Maryland Biological Stream Survey (MBSS) results. Information from MBSS data collected between 1994 and 1997 can be found in MDNR 2001r.

8.20.1 Ecological Health

Based on the three ecological health indicators used by the MBSS, the overall condition of Queen Anne's County streams during 2000-2004 was Fair (Figure 8-159). The FIBI results indicate that 41% of the streams in the county were in Good condition, and 35% rated Good using the BIBI. In contrast, 38% of the streams in the county scored as Poor or Very Poor using the CBI, while 33% scored as Good and 30% scored as Fair.

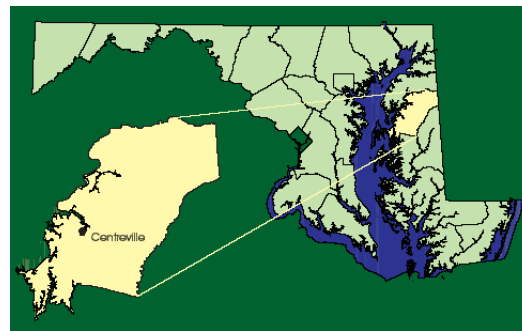
There was no clear geographic pattern in IBI scores. The highest rated stream in Queen Anne's County using the Combined Biotic Index (CBI) was Mill Stream Branch, while the lowest rated streams included unnamed tributaries to Andover Branch, Granny Finley Branch and Beaverdam Ditch (Table 8-39). Based on Stream Waders volunteer data, the number of sites rated as Poor or Very Poor for benthic macroinvertebrates outnumbered the sites rated Good by seven fold (Table 8-40).

One current and one former MBSS Sentinel site were located in Queen Anne's County. The former site is an unnamed tributary to the East Wye River, and the current site is an unnamed tributary to Emory Creek. Sentinel sites were chosen to provide a representation of the best remaining streams around the state and track natural variations in stream health. Where possible, Sentinel sites are located in watersheds with as much protected land as possible, or in areas projected to become degraded from development at a slower pace. In the case of the Wye River tributary, the site was dropped from the Sentinel network because of lowering Combined Biotic Index scores. More information about the MBSS Sentinel stream network is found in: 2000-2004 Maryland Biological Stream Survey Volume 11: Sentinel Sites (http://www/dnr/Maryland.gov/streams/pubs/ea05-8_sentinel.pdf).

8.20.2 Physical Habitat

8.20.2.1 Overall Condition

Based on the Physical Habitat Index (PHI), 15% of the streams in Queen Anne's County had Minimally Degraded habitat, 40% had Partially Degraded habitat, and about 48% had Degraded or Severely Degraded habitat.



(Figure 8-160). In general, physical habitat quality was higher in the eastern portion of the county.

8.20.3 Trash

An estimated 81% of the stream miles in Queen Anne's County were rated Optimal for trash during 2000-2004 MBSS sampling (Figure 8-161). In contrast, 5% of streams were rated as Marginal, and no stream miles were rated as Poor. There was no geographic trend in the distribution of sites with trash.

8.20.3.1 Channelization

About 43% of the stream miles in Queen Anne's County were channelized to some extent (Table 8-4). Earthen ditches (36%), culvert pipes (3%) and concrete channels (5%) were the types of channelization found at MBSS sites. Most ditching occurred in the eastern part of the county (Figure 8-162).

8.20.3.2 Inadequate Riparian Buffer

No stream miles in Queen Anne's County were devoid of riparian buffers during the 2000-2004 MBSS (Table 8-3). However, 5% of stream miles had severe breaks in existing riparian buffers. No geographic pattern in the distribution of buffer breaks was evident (Figure 8-163). Additional information about buffer breaks, analyzed by county, is provided in: 2000-2004 Maryland Biological Stream Survey Volume 10: Riparian Zone Conditions (http://www/dnr/Maryland.gov/streams/pubs/ea05-7_biodiv.pdf).

8.20.3.3 Eroded Banks/Bedload Movement

Nearly 65% of the stream miles in Queen Anne's County were rated as having minimal (Optimal) amounts of bank erosion (Figure 8-164). In contrast, 17% of the stream miles in the county were rated as Poor for bank erosion and an additional 10% were rated as Marginal. No clear geographic pattern in bank erosion was evident.

Nearly 51% of the stream miles in Queen Anne's County were rated as having minor or no bar formation (Figure 8-164). Of the remaining streams, 31% were rated as having moderate prevalence of bars and 34% had extensive bar formation. No clear geographic pattern in bar formation was evident.

8.20.4 Key Nutrients

8.20.4.1 Nitrate-Nitrogen

All but 15% of the stream miles in Queen Anne's County had nitrate-nitrogen levels above the range for forested Maryland streams (Figure 8-165). Of the streams with elevated levels, 15% were above the 5 mg/l threshold where biological impacts have been documented, and the remaining 63% of stream miles had nitrate-nitrogen levels between 1 and 5 mg/l. In general, nitrate-nitrogen levels were higher in the northern part of the county.

8.20.4.2 Total Phosphorus

Only 9% of the stream miles in Queen Anne's County had low levels of total phosphorus (Figure 8-166). Of the remaining 91% of stream miles that had elevated total phosphorus levels, 25% had total phosphorus levels above the threshold where faunal loss may occur. Total phosphorus levels were clearly higher in the western portion of the county.

8.20.5 Stream and River Biodiversity

To provide a means to prioritize stream systems for biodiversity protection and restoration within each county and on a statewide basis, a tiered watershed and stream reach prioritization method was developed. Special emphasis was placed on state-listed species, stronghold watersheds for state-listed species, and stream reaches with one or more state-listed aquatic fauna. Fauna considered included stream salamanders, freshwater fishes, and freshwater mussels. Rare, pollution-sensitive benthic macroinvertebrates collected during the 1994-2004 MBSS were also used to identify the suite of watersheds necessary to conserve the full array of known stream and river biota in Maryland. A complete description of the biodiversity ranking process is found in: 2000-2004 Maryland Biological Stream Survey Volume 9: Stream and Riverine Biodiversity (http://www/dnr/Maryland.gov/streams/pubs/ea05-6_biodiv.pdf).

Of the six watersheds found in Queen Anne's County, Corsica River/Southeast Creek, Upper Chester River, and Tuckahoe Creek were classified as Tier 1, meaning that these watersheds serve as strongholds for one or more state listed aquatic species (Figure 8-167). It is also noteworthy that the Corsica River/ Southeast Creek and Upper Chester River watersheds are among the top six in Maryland in terms of stream and river biodiversity ranking, and Tuckahoe Creek ranked tenth in the state. In contrast, the Middle Chester River watershed was the lowest ranked for stream and river biodiversity in the county, and ranked 57th of 84 in Maryland. Any reaches that had either state-listed or GCN species, or high intactness values were highlighted to facilitate additional emphasis in planning restoration and protection activities.

8.20.6 Stressors

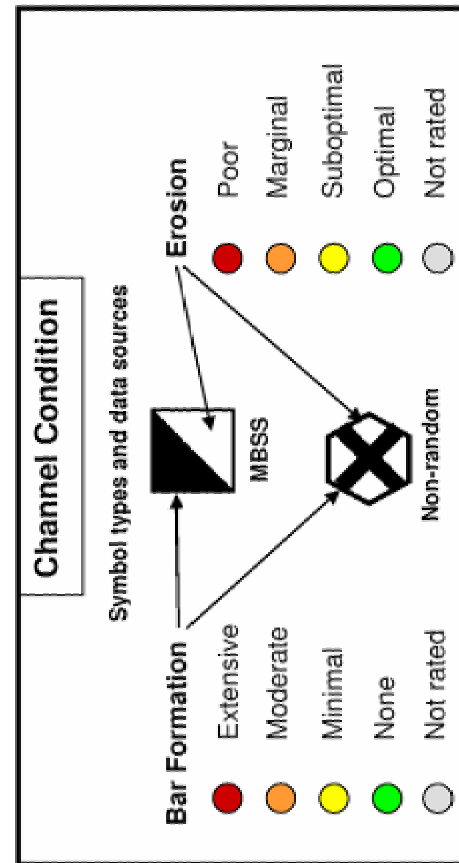
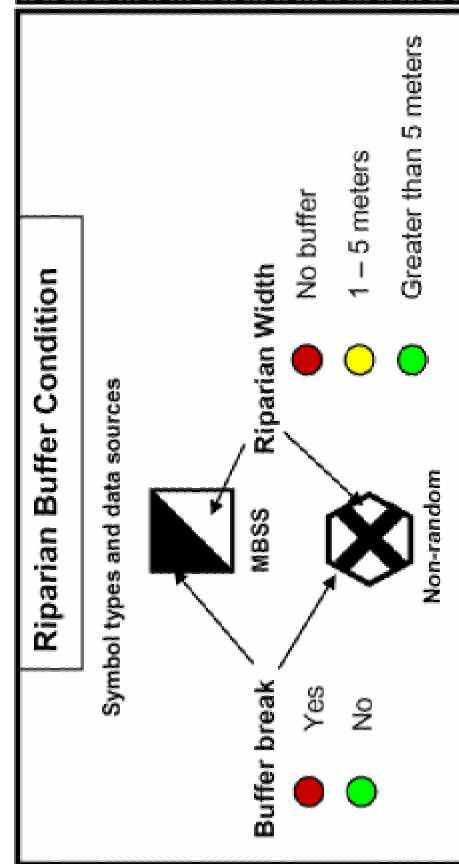
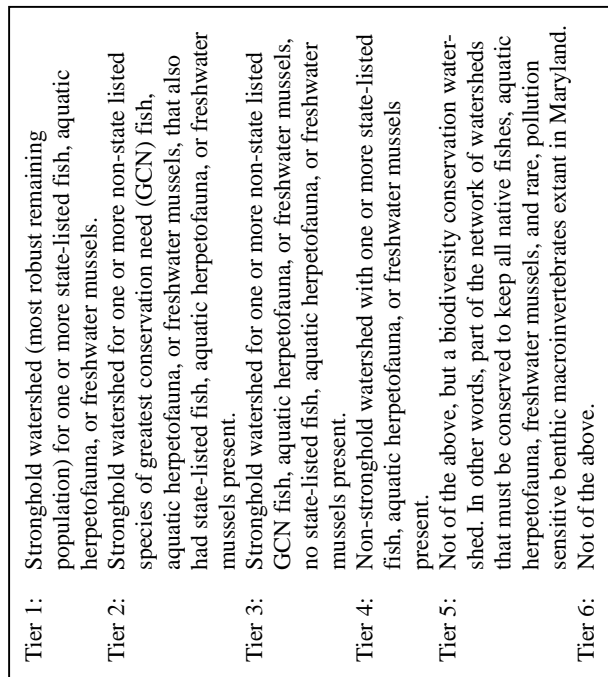
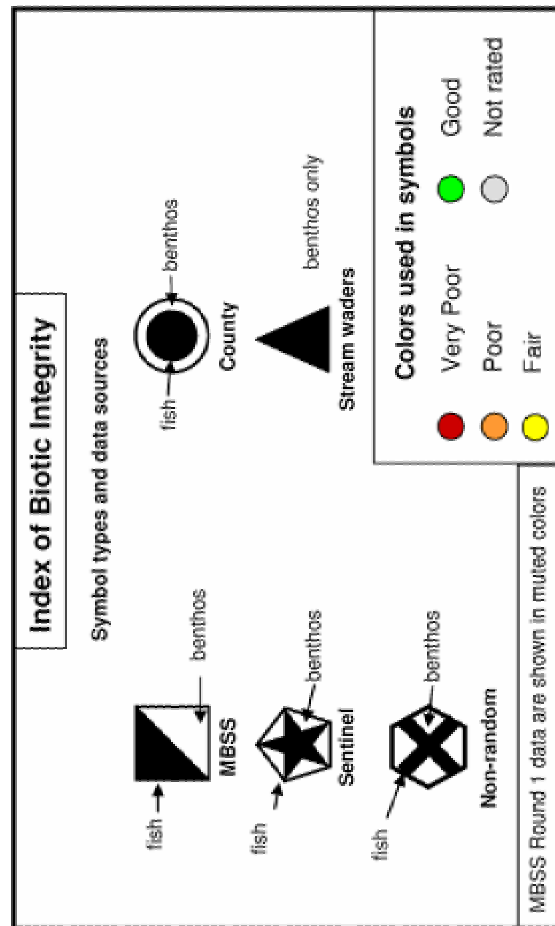
At 94% of stream miles, the most extensive stressor characterized by the MBSS in Queen Anne's County during the 2000-2004 MBSS was non-native terrestrial plants in the riparian zone (Figure 8-5). Other stressors commonly found were: streams with non-native aquatic fauna (63% of stream miles); eroded banks (32% of stream miles); channelized streams (observed in 36% of stream miles); and high nitrates (22% of stream miles). Several other stressors affected 5% or less of the stream miles in the county. These included areas with > 5% urban land use upstream and low dissolved oxygen.

AN IMPORTANT NOTE ON BIODIVERSITY MANAGEMENT

Perhaps the largest ongoing natural resources restoration and protection effort in Maryland is associated with the Chesapeake Bay. In most cases, freshwater biodiversity is not specifically considered during placement and prioritization of Bay restoration and protection projects. In this report and in the more detailed volume in the series on aquatic biodiversity, a system of biodiversity ranking is presented to provide counties and other stewards with a means to plan appropriate protection and restoration activities in locations where they would most benefit stream and river species. Given the historically low level of funding for biodiversity protection and restoration in Maryland and elsewhere, the potential benefit of incorporating freshwater biodiversity needs into other efforts is quite large.

However, it is important to note that although freshwater taxa are the most imperiled group of organisms in Maryland, other groups and individual species not typically found in freshwater habitats are also at high risk and constitute high priority targets for conservation. In addition, freshwater taxa that prefer habitats such as small wetlands may not be well-characterized by the ranking system employed here. To conserve the full array of Maryland's flora and fauna, it is clearly necessary to use other, landscape-based tools and consider factors such as maintaining or reconnecting terrestrial travel corridors.

Key to MBSS 2000-2004 County Maps



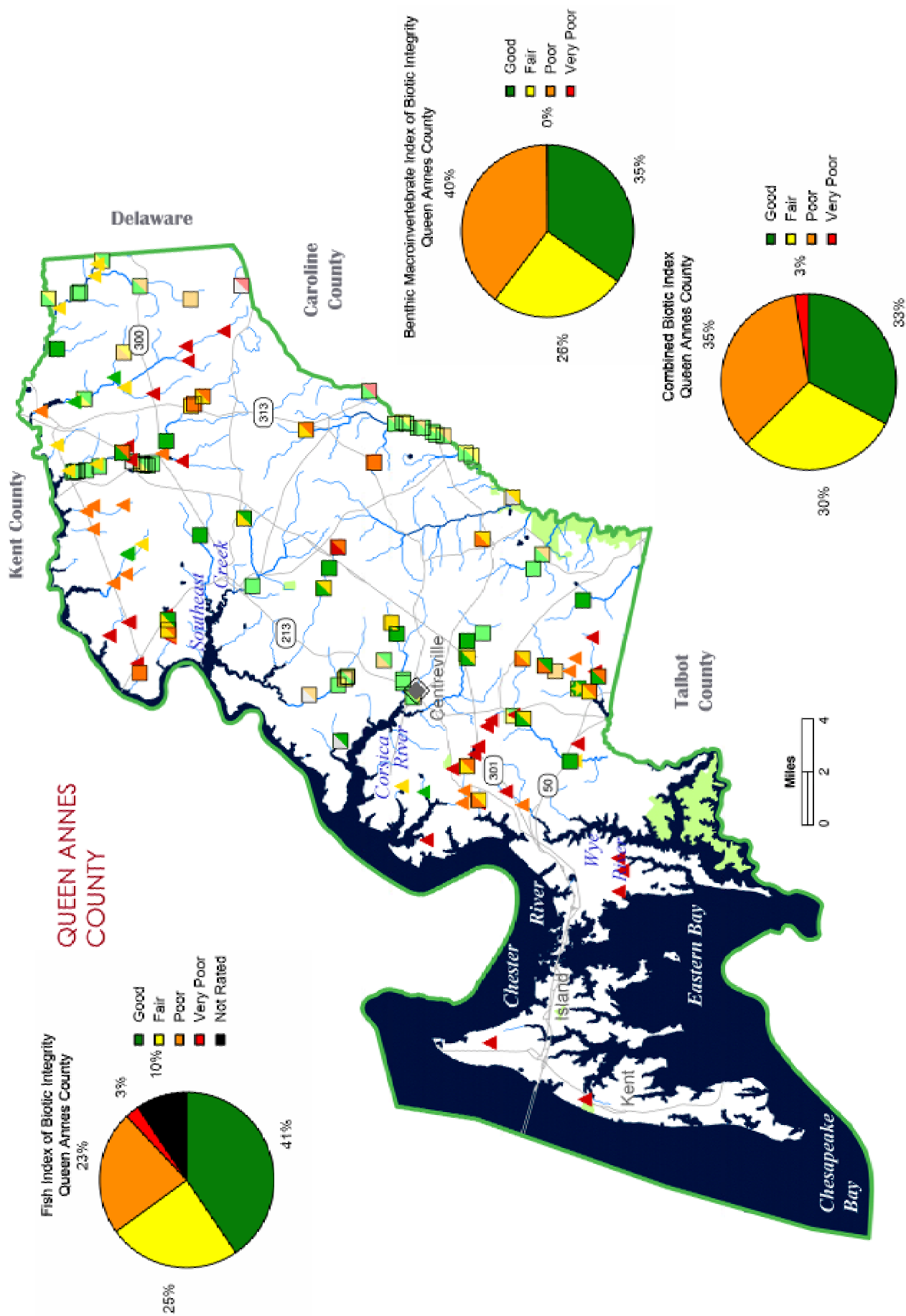


Figure 8-159. Benthic Index of Biotic Integrity (BIBI) and Fish Index of Biotic Integrity (FIBI) pie charts and map of stream health for Queen Anne's County streams sampled by the MBSS during 1995-97 and 2000-2004 (pie charts represent 2000-2004 data only, Combined Biotic Index pie chart represents mean of FIBI and BIBI)

Table 8-40. Stream Waders sites sampled in Queen Anne's County during 2000-2004, ranked by Family-level Benthic Index of Biotic Integrity

| Queen Anne's County - Stream Wader Sites | | | | |
|--|--------|--------|--------|-------------|
| WATERSHED | # GOOD | # FAIR | # POOR | # VERY POOR |
| Corsica River | 2 | 1 | 1 | 5 |
| Eastern Bay | 0 | 0 | 0 | 2 |
| Kent Narrows | 0 | 0 | 0 | 3 |
| Chester River Lower | 1 | 1 | 2 | 5 |
| Chester River Middle | 0 | 0 | 1 | 7 |
| Southeast Creek | 1 | 5 | 5 | 8 |
| Tangier Sound | 1 | 0 | 0 | 0 |
| Chester River Upper | 4 | 8 | 7 | 7 |
| Wye River | 0 | 1 | 3 | 7 |

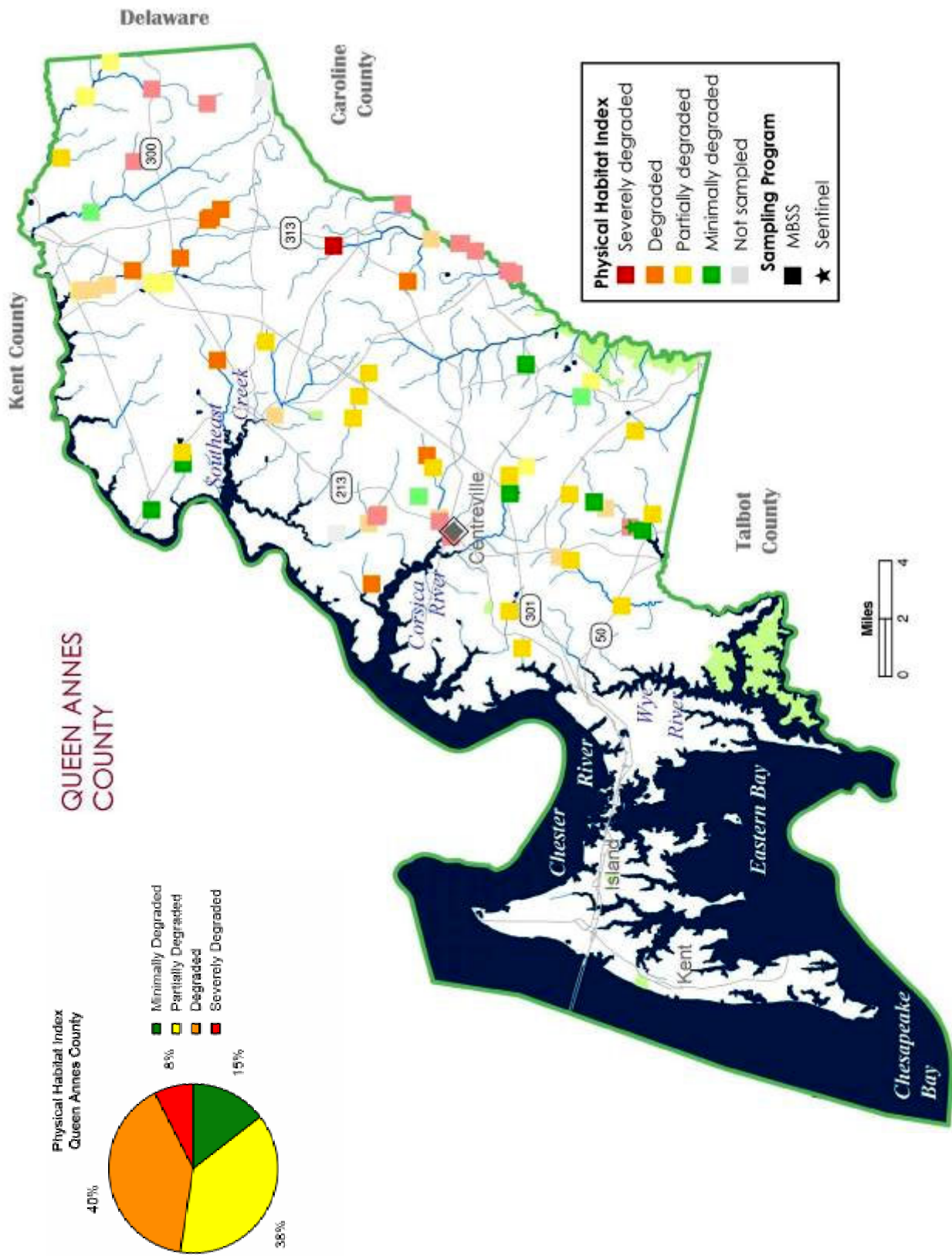


Figure 8-160. Physical Habitat Index (PHI) pie chart and map of stream habitat quality for Queen Anne's County streams sampled by the MBSS during 1995-97 and 2000-2004 (pie chart represents 2000-2004 data only)

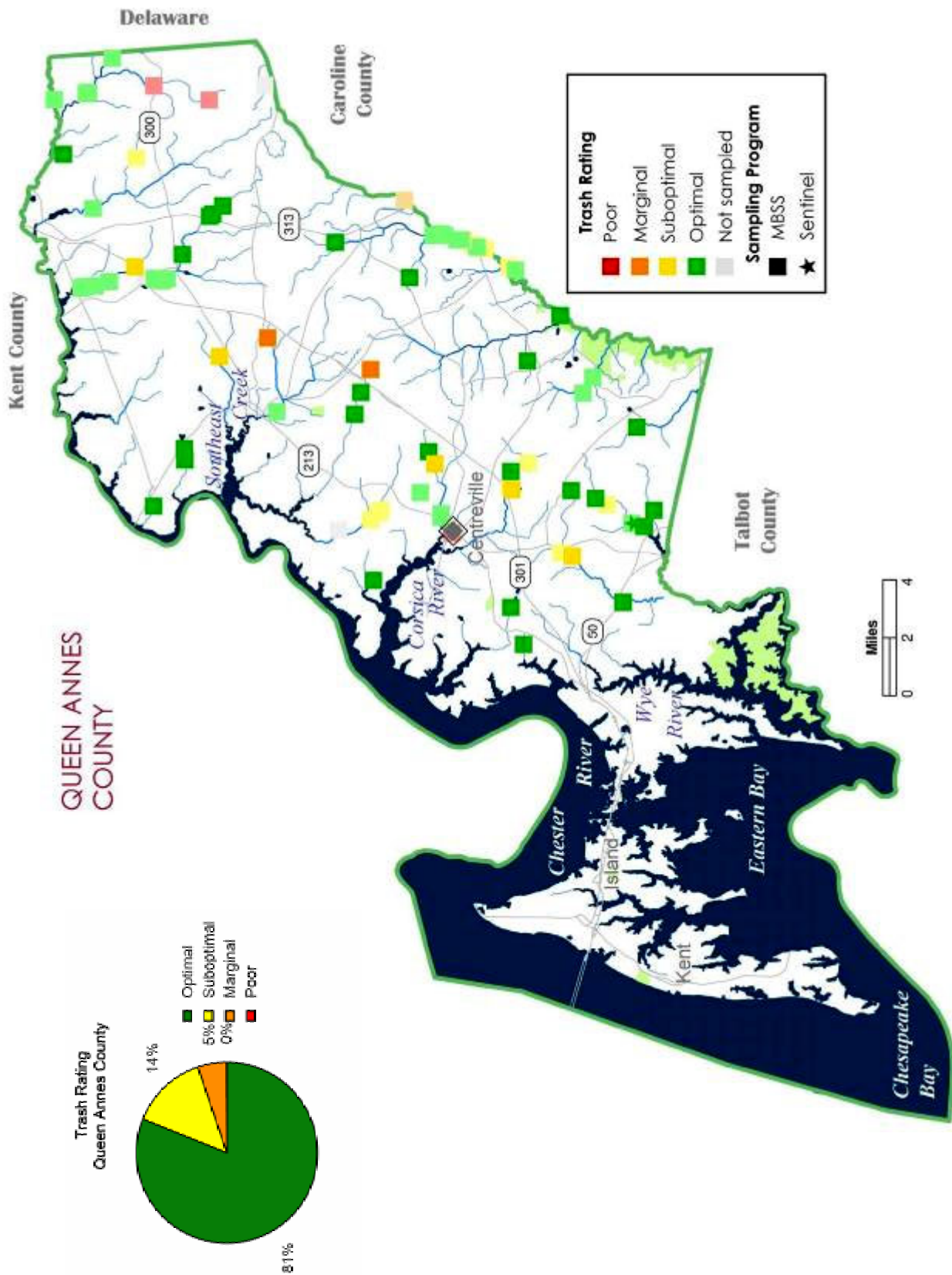


Figure 8-161. Pie chart and map of trash rating (0-20 scale) for Queen Anne's County streams sampled by the MBSS during 1995-97 and 2000-2004 (pie chart represents 2000-2004 data only)

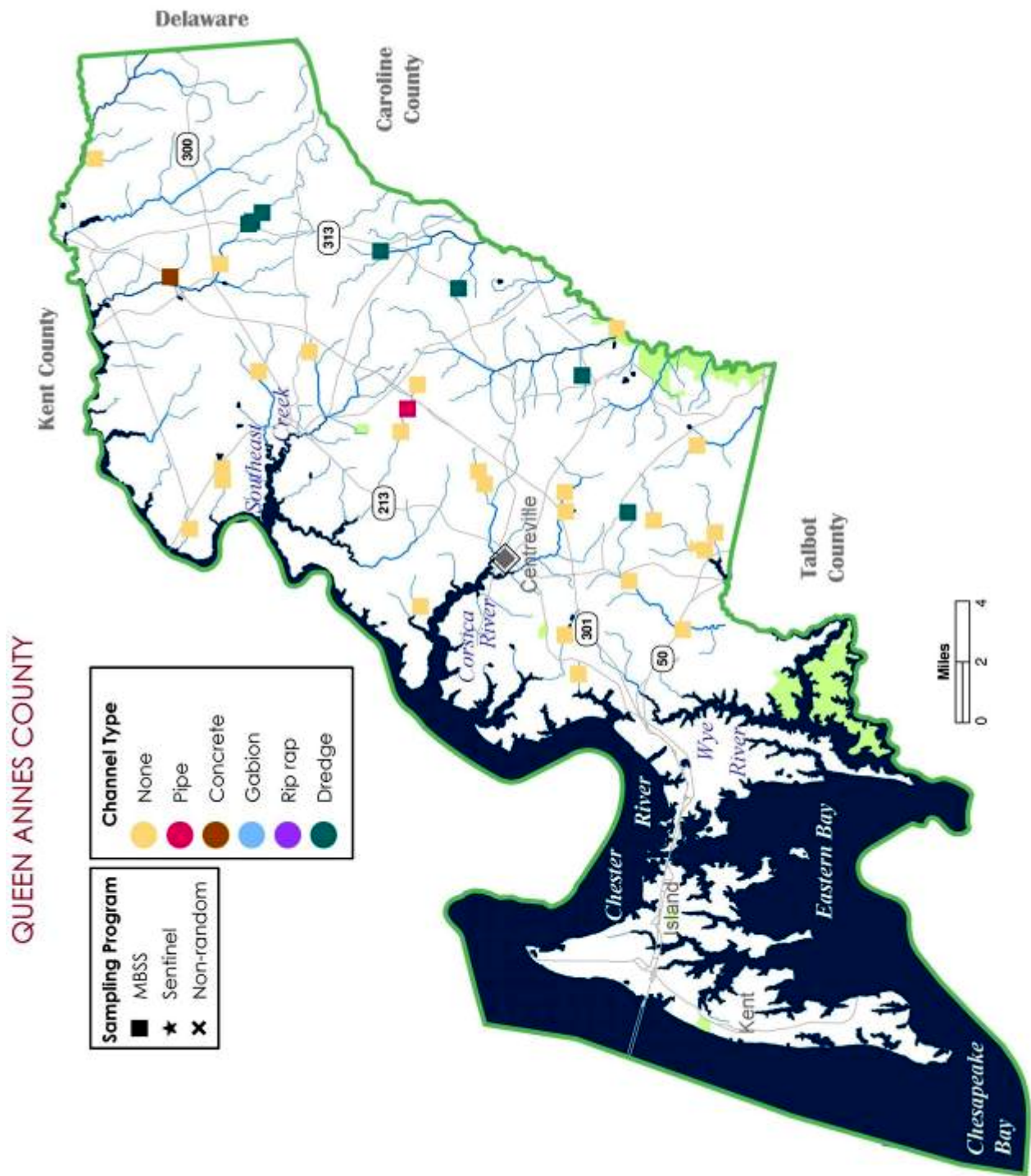


Figure 8-162. Map of channelized sites, by type, for Queen Anne's County streams sampled by the MBSS during 2000-2004. *NOTE: When channelization is indicated, it does not necessarily mean that the entire 75m segment was affected.*



Figure 8-163. Map of sites with inadequate riparian buffers and buffer breaks for Queen Anne's County streams sampled by the MBSS during 2000-2004. *NOTE: Multiple riparian buffer breaks sometimes occurred at a site; only the most severe was depicted.*

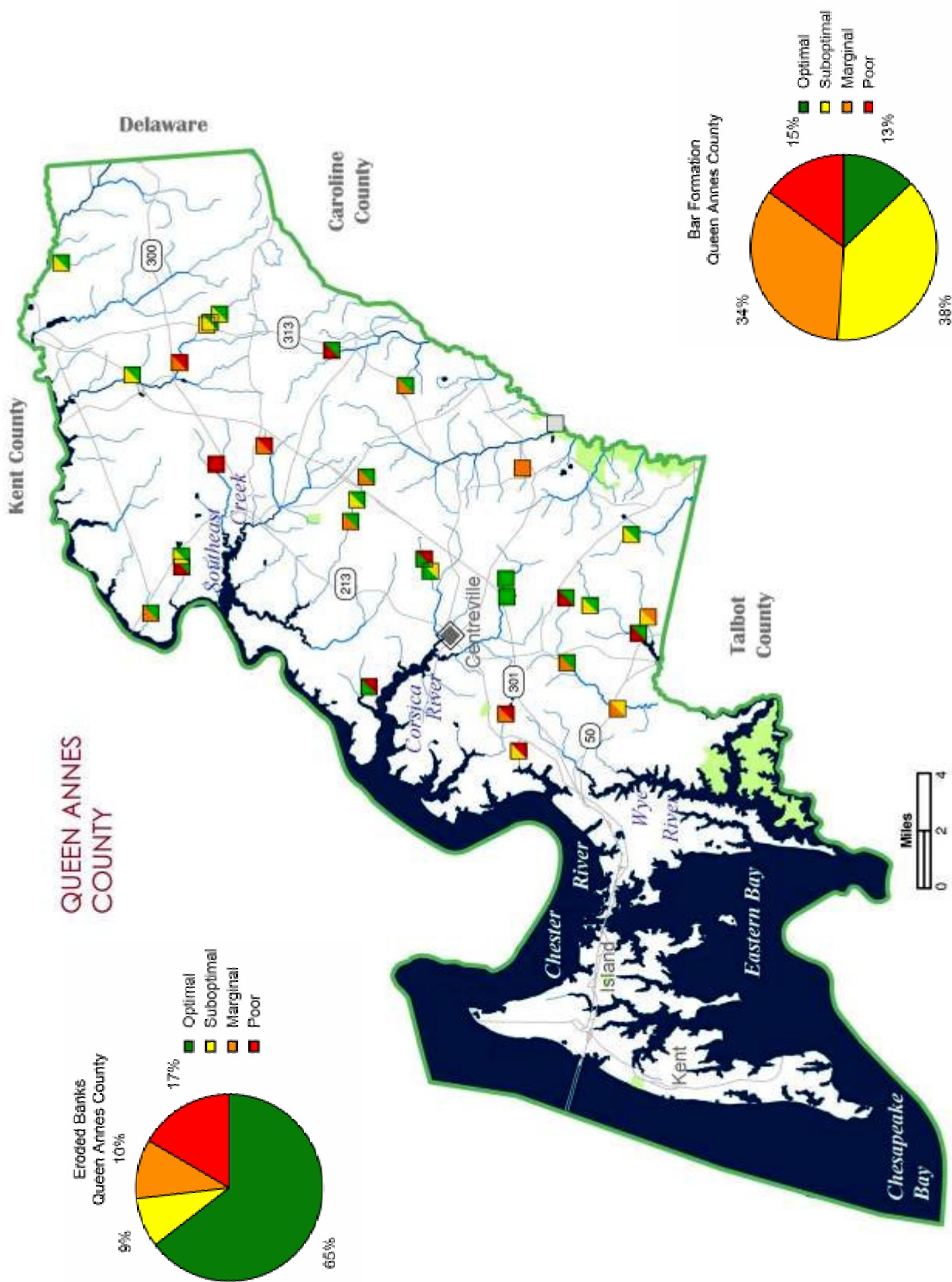


Figure 8-164. Pie charts and map of sites with eroded banks and instream bar formation for Queen Anne's County streams sampled by the MBSS during 2000-2004

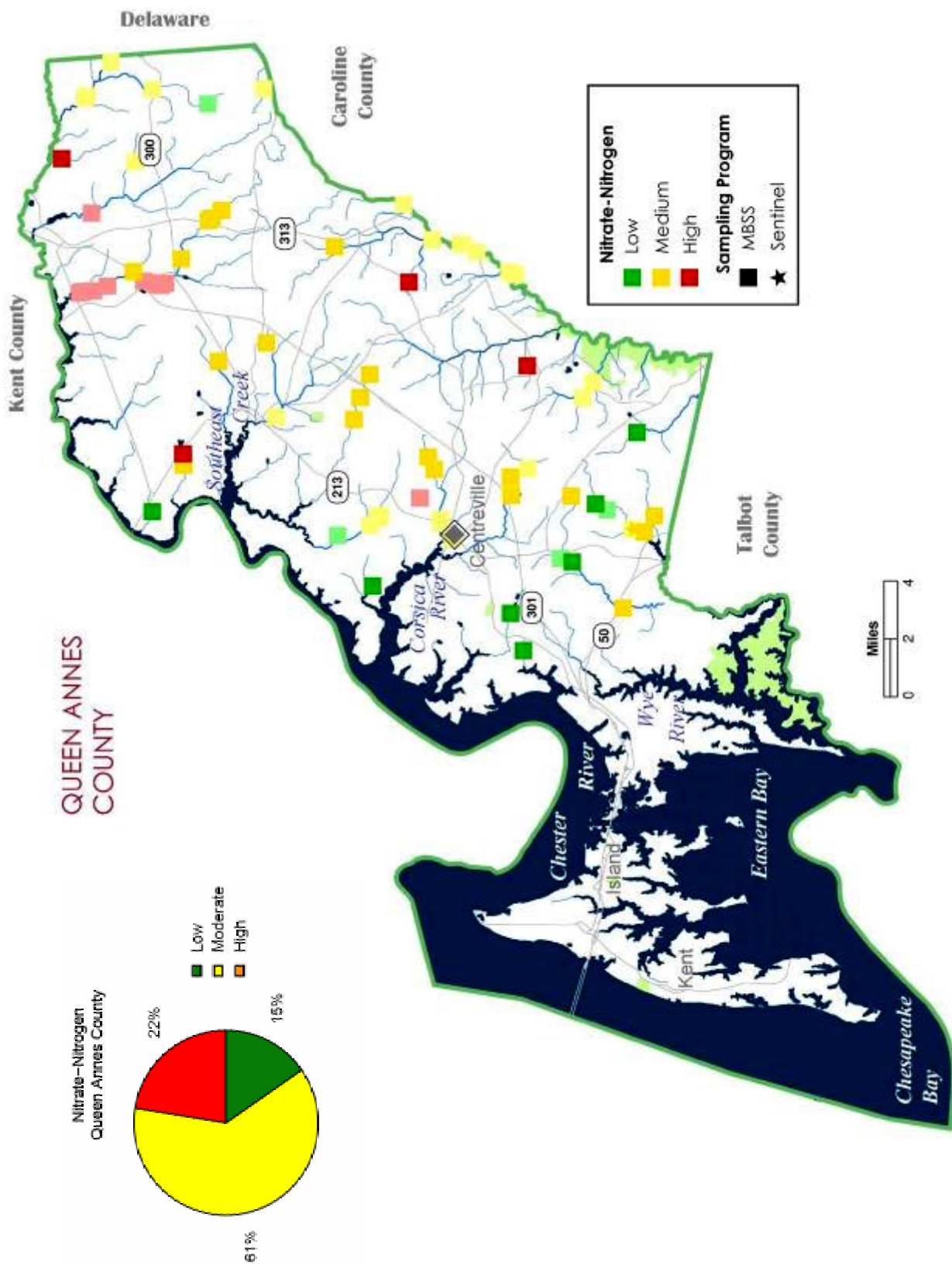


Figure 8-165. Pie chart and map of nitrate-nitrogen values (mg/l) for Queen Anne's County streams sampled by the MBSS during 1995-97 and 2000-2004 (pie chart represents 2000-2004 data only) (Low = 1.0, Medium = 1.0 – 5.0, High = > 5.0)

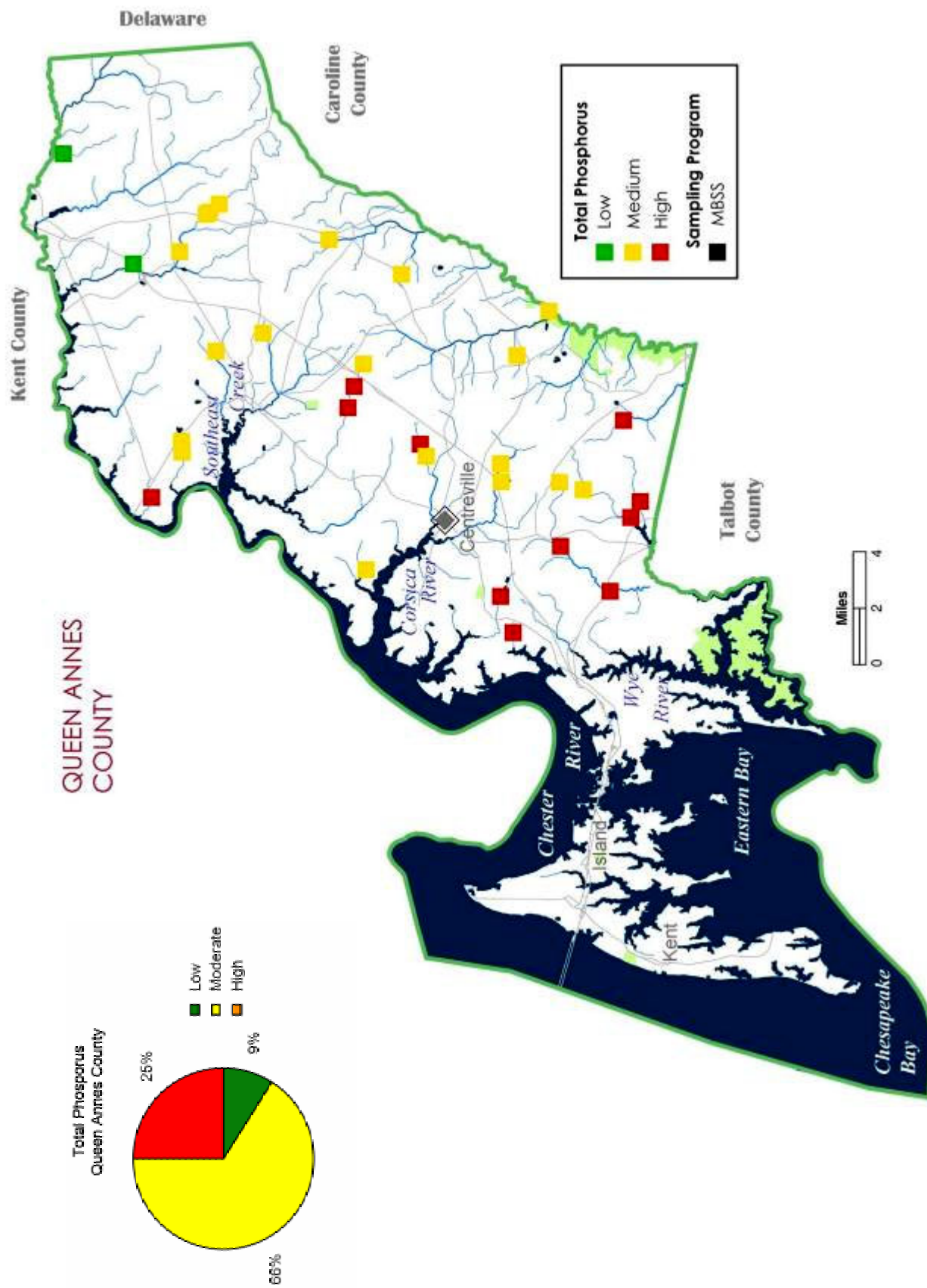


Figure 8-166. Pie chart and map of total phosphorus values (mg/l) for Queen Anne's County streams sampled by the MBSS during 2000-2004 (Low = < 0.025, Medium = 0.025 – 0.07, High = > 0.07)

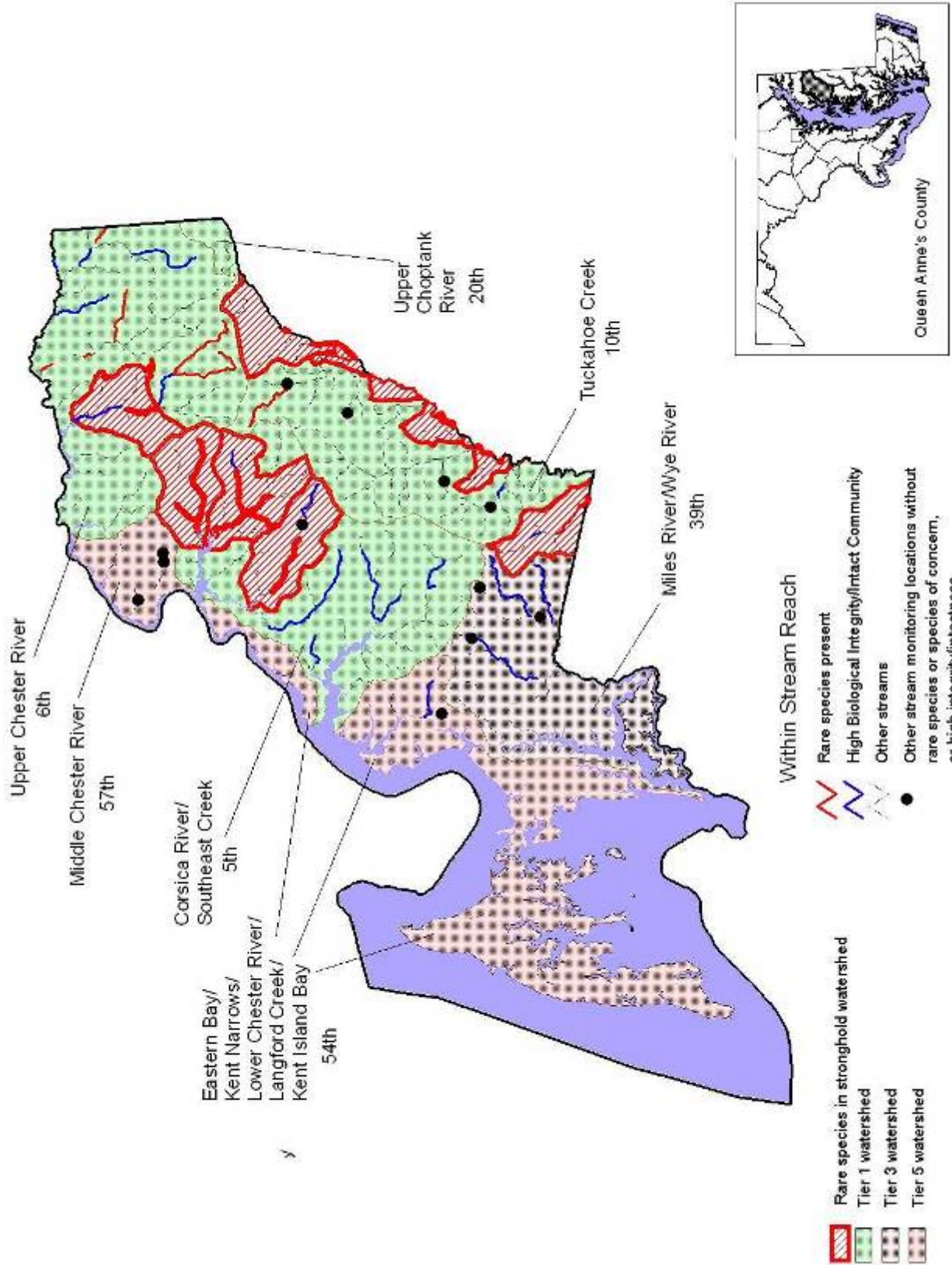


Figure 8-167. Aquatic Heritage Biodiversity Ranking map for Queen Anne's County, by watershed. Data from MBSS 1994-2004, MBSS qualitative data, Raesly, unpub. data, Harris 1975, Thompson 1984, and DNR Natural Heritage Program database.